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Abstract

The A-value technique as a means of studying phosphate availability in rice soils.

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The present paper describes some experiments carried out in the greenhouse on a number of soil types, using granulated superphosphate labelled with P^{32} as a standard. The effect of time on the specific activities of roots and shoots and the effect of seed phosphorus were studied. Rice plants were used as test plants.

1 - Effect of time - It was found that seed density had little effect on the A-value, even at early stages of development. The specific actividy of roots and shoots was found to be identical for each sampling. It was further established that under submerged conditions the A-value increases with time. When the technique is used to compare A-values of different soils, different phosphate materials or methods of application, it is essential to compare data after the same time of immersion.

2 - Effect of seed phosphorus - Early harvest introduces the effect of seed phosphorus which may constitute an appreciable part of the total phosphorus in the plant. In order to test the effect of seed phosphorus, seed labelled with P^{32} was obtained by applying P^{32} labelled solutions to rice plants at flowering stages. The radioactive seeds were harvested and used for a series of pot experiments.

2.1. - Outgo or exchange of phosphorus from rice plants- Labelled seeds were germinated and subsequently grown on Hoagland nutrient solution. It was found that less than 2% of the total activity of the seeds was found in the remaining culture solutions assayed for P^{32}.

2.2 - Effect of seed density and water conditions on the distribution of seed phosphorus in rice plants - The rice plants were grown under upland and lowland conditions 60-80% of the phosphorus was found back in the shoots. Seed density and water conditions had no effect on the distribution of seed phosphorus.

2.3 - Effect of P level in the soil and source of fertilizer on the distribution of seed phosphorus in rice plants - A sand culture experiment was carried out, comparing the following treatments: 1) two levels of phosphate, 2) two nitrogen sources (NO_3 and NH_4 respectively), 3) three stages of development.

It was found that 60-80% of the seed phosphorus was found back in the shoots. Neither phosphorus level of the culture solutions nor nitrogen source had any effect on the distribution of seed phosphorus.

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